

Chi-Square HW #1-3

1. Ho: the observed frequency distribution of where people have their first cup of coffee fits the expected distribution

Ha: the observed frequency distribution of where people have their first cup of coffee does not fit the expected distribution

$$\chi^2 = \sum \frac{(\text{obs} - \text{exp})^2}{\text{exp}} = \frac{(389 - 406.7)^2}{406.7} + \frac{(110 - 98.77)^2}{98.77} + \dots = 3.7536$$

$$P(\chi^2 > 3.7536 \mid df = 3) = 0.2893$$

We fail to reject the Ho because p-value is $>$ alpha of 0.05. We have sufficient evidence that the observed frequency distribution of where people have their first cup of coffee fits the expected distribution. There has not been a change in the claimed distribution.

2. Ho: the observed frequency distribution of reasons workers leave their jobs fits the expected distribution

Ha: the observed frequency distribution of reasons workers leave their jobs does not fit the expected distribution

$$\chi^2 = \sum \frac{(\text{obs} - \text{exp})^2}{\text{exp}} = \frac{(78 - 82)^2}{82} + \frac{(52 - 50)^2}{50} + \dots = 2.0251$$

$$P(\chi^2 > 2.0251 \mid df = 4) = 0.7311$$

We fail to reject the Ho because p-value is > alpha of 0.05. We have sufficient evidence that the observed frequency distribution of reasons workers leave their jobs fits the expected distribution. Therefore, the distributions are not different.

3. H_0 : the observed frequency distribution of bicycle accidents is uniformly distributed throughout the days of the week.

H_a : the observed frequency distribution of bicycle accidents is not uniformly distributed throughout the days of the week.

$$\chi^2 = \sum \frac{(\text{obs} - \text{exp})^2}{\text{exp}} = \frac{(118 - 130.143)^2}{130.143} + \frac{(119 - 130.143)^2}{130.143} + \dots = 4.6476$$

$$P(\chi^2 > 4.6476 \mid df = 6) = 0.5897$$

$$\frac{911}{7}$$

uniform

We fail to reject the H_0 because p-value is $>$ alpha of 0.05. We have sufficient evidence that the observed frequency distribution of bicycle accidents is uniformly distributed throughout the days of the week. Therefore, the bicycle accidents are not more common on any one day of the week.